

Gulf Coast Stacked Storage Field Test



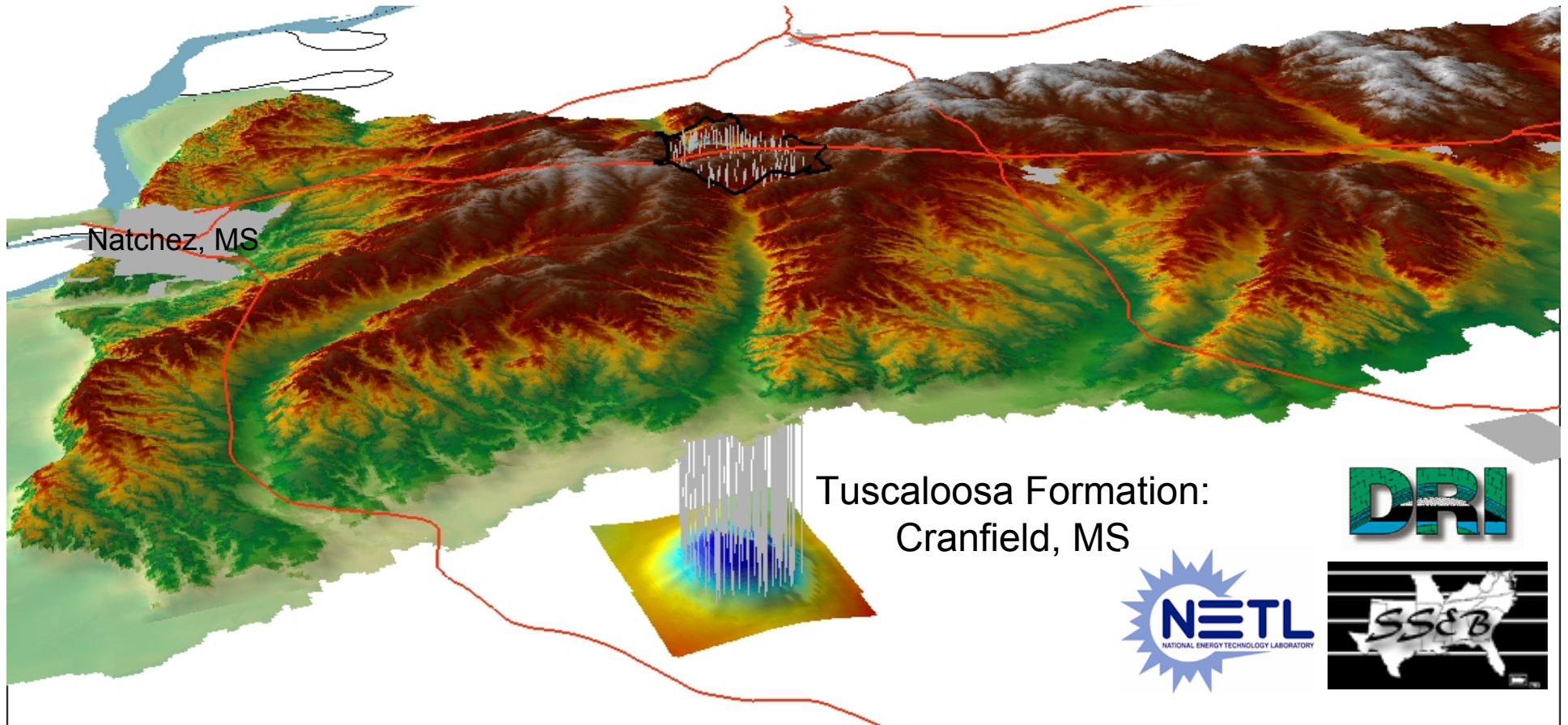
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Gulf Coast Carbon Center

Bureau of Economic Geology












Jackson School of Geosciences

The University of Texas at Austin

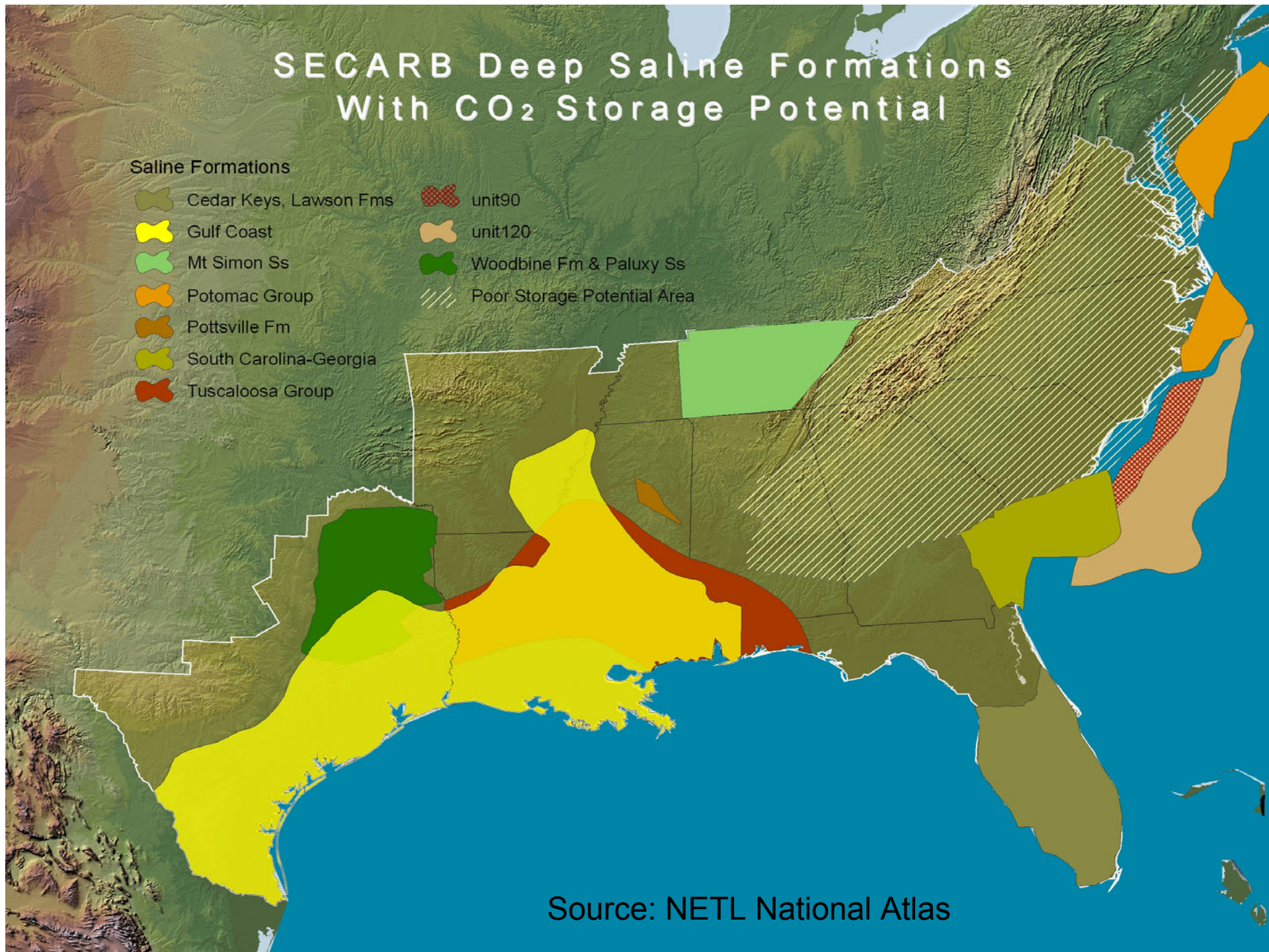


SECARB Deep Saline Formations With CO₂ Storage Potential

Saline Formations

- | | |
|--|---|
|  Cedar Keys, Lawson Fms |  unit90 |
|  Gulf Coast |  unit120 |
|  Mt Simon Ss |  Woodbine Fm & Paluxy Ss |
|  Potomac Group |  Poor Storage Potential Area |
|  Pottsville Fm | |
|  South Carolina-Georgia | |
|  Tuscaloosa Group | |

Source: NETL National Atlas



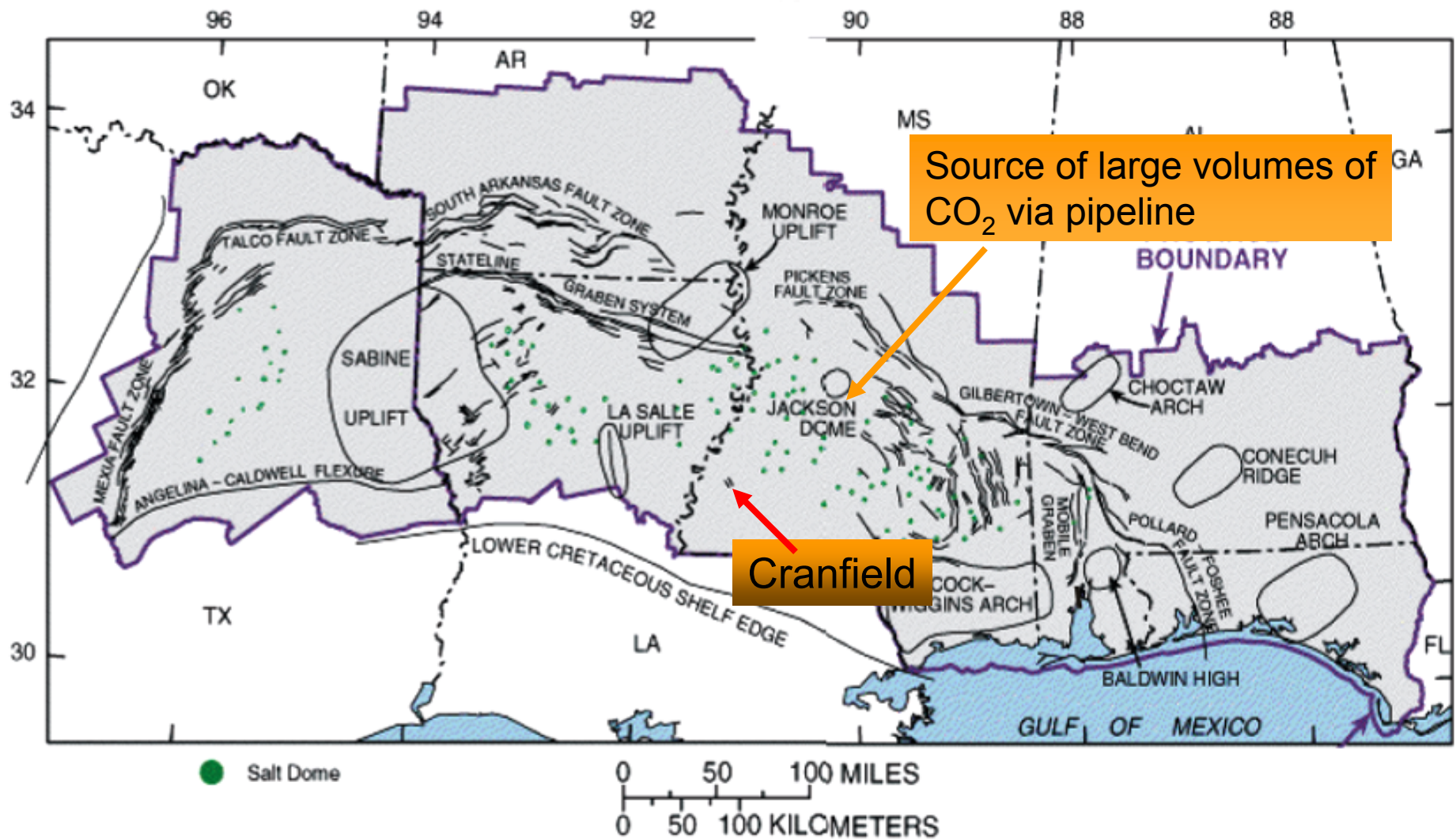
Considerations for Site Selection

- Large volumes of CO₂ available in 2007 at no project cost from Denbury's *Sonat* pipeline.
- Well-known geologic environment representing a formation of regional significance.
- Minerals rights owned by Denbury.
- Surface ownership well known.
- Opportunity to re-enter existing well(s) for monitoring (minimized well costs).

Expected results

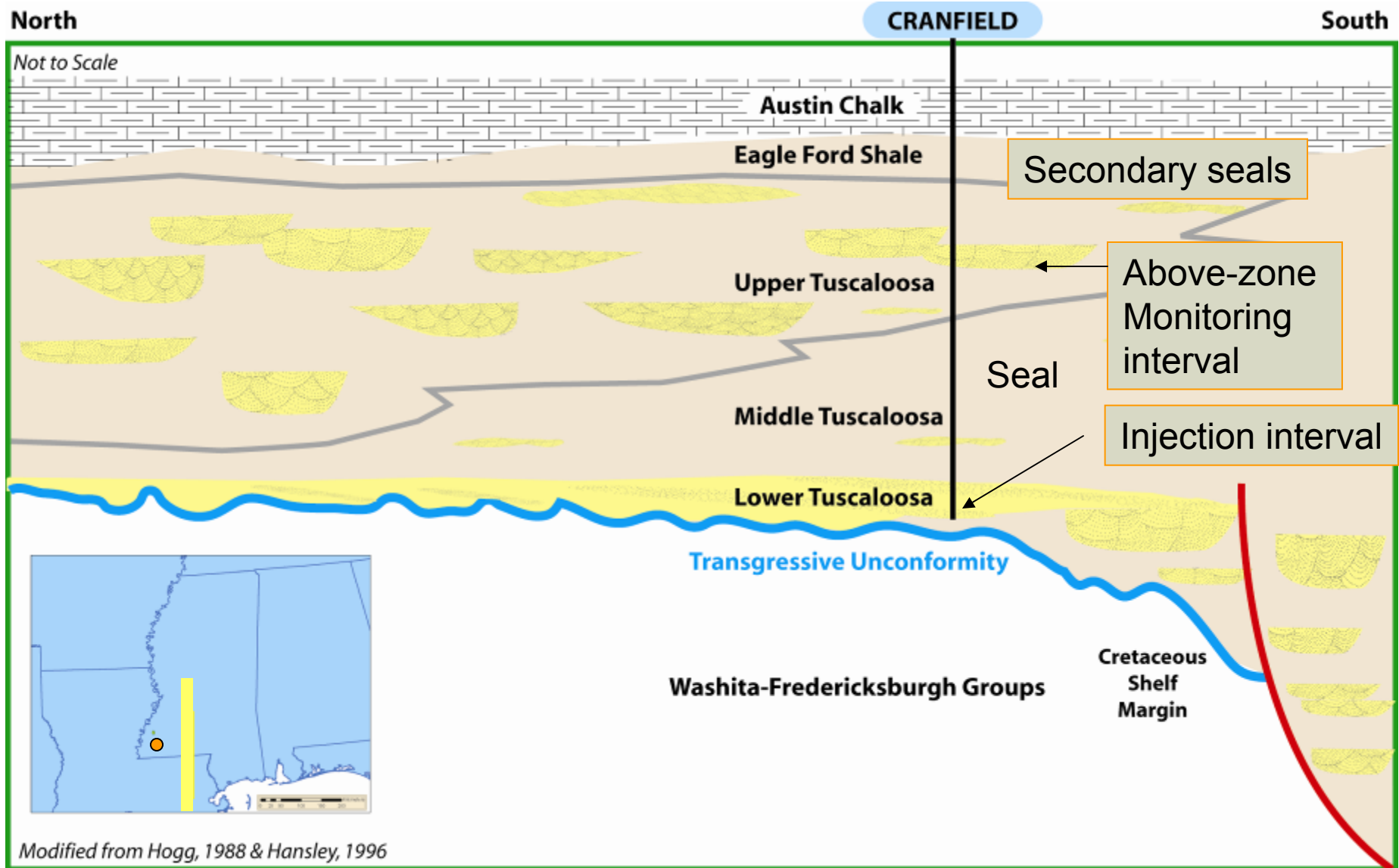
- **Documenting that the observed injection is effective: Increased confidence in reservoir + seal performance for a widely prospective formation.**
 - Above-zone monitoring
- **Development of best practices for MMV for application in future commercial storage sites.**
- **Determination of adequacy of current regulations for avoiding unacceptable risks.**
 - Wellbore integrity, reservoir pressure response.

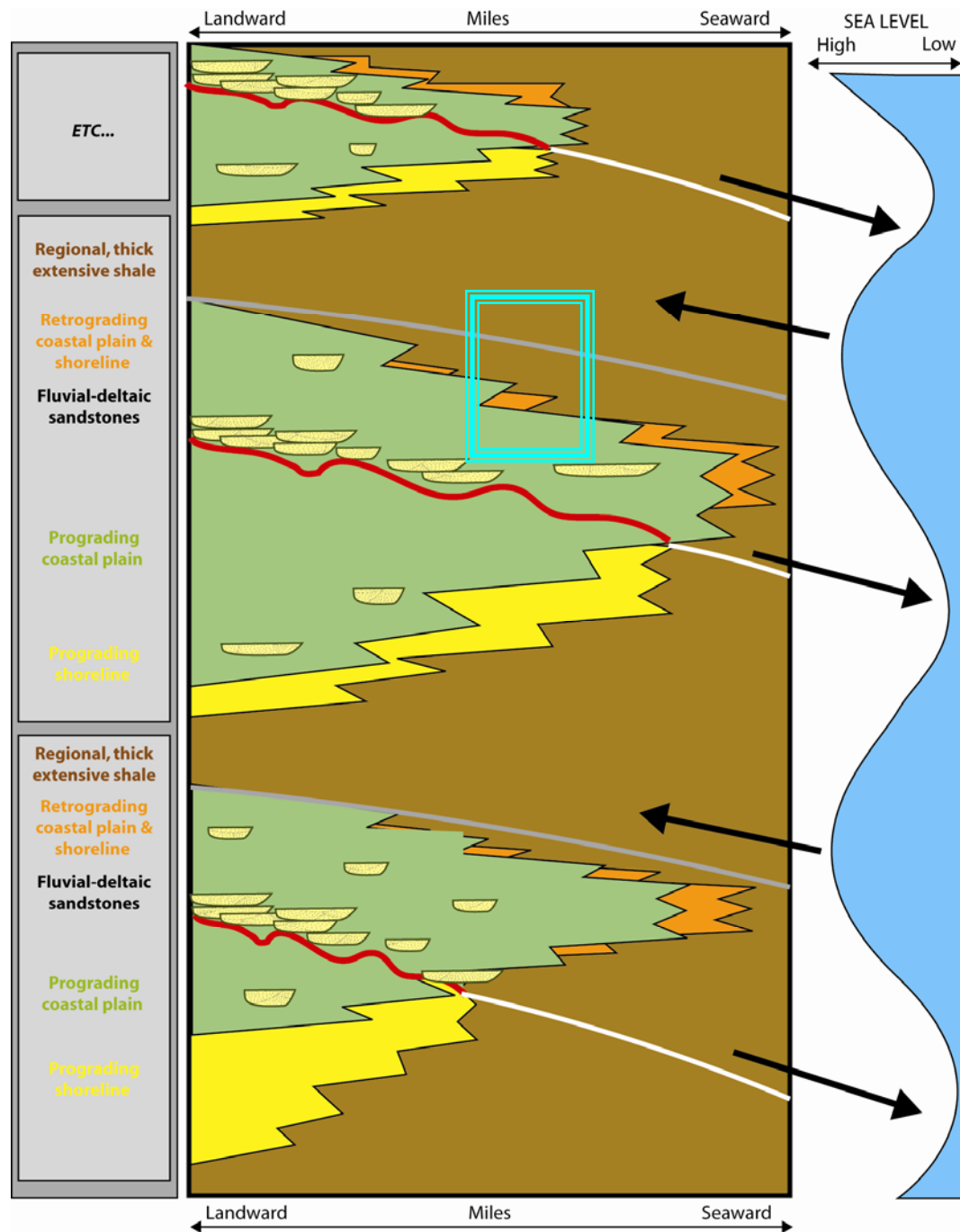
Cranfield is part of Upper Cretaceous Tuscaloosa-Woodbine Trend of the Mississippi Salt Basin

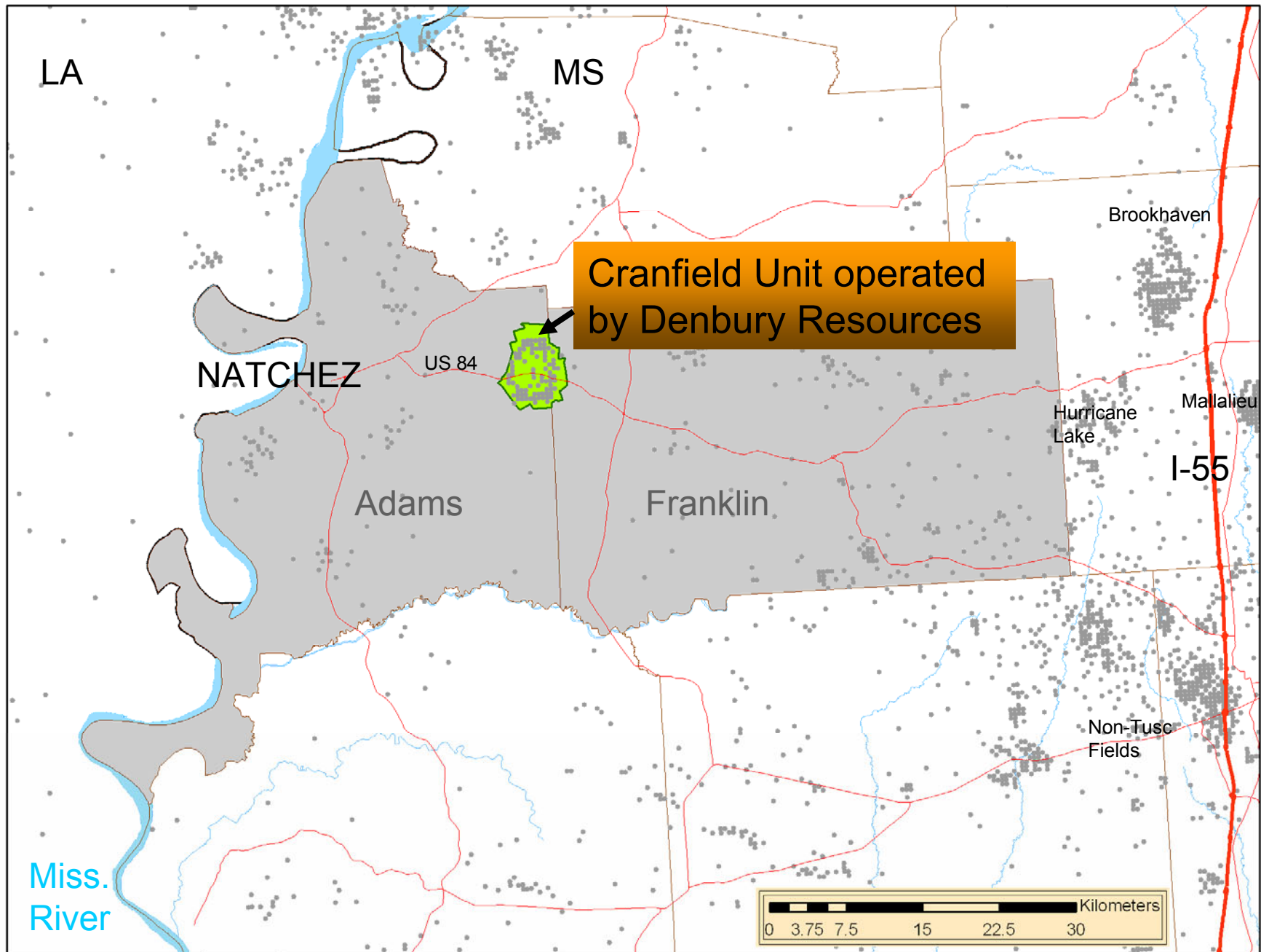


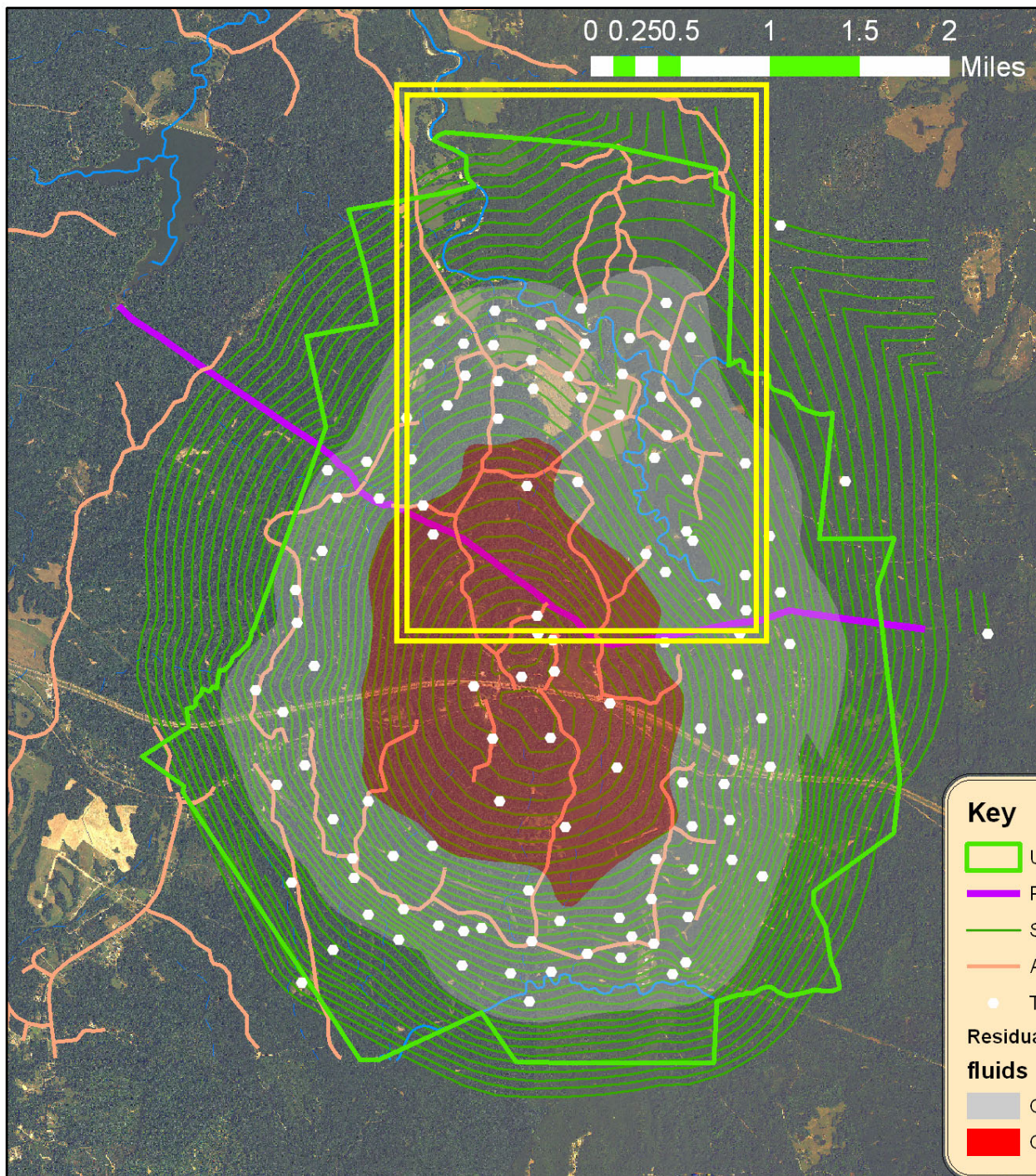
Source: Dutton and others 1993

Schematic Upper Cretaceous cross-section









CRANFIELD MAPS

OBSERVATION WELL LOCATION

3 MMCFD Injection rates
 ~ 8 wells by 2008 =
 24 MMCFD = ½ Million Tons/yr

Key

- Unitized area
- Pipeline
- Structure Contour
- Access roads
- Tuscaloosa Wells
- Study area
- Residual fluids**
- Oil Ring
- Gas Cap

Ella G Lees #7

9,800'

Proposed monitoring interval

9,900'

10,000'

10,100'

STRINGER SANDS

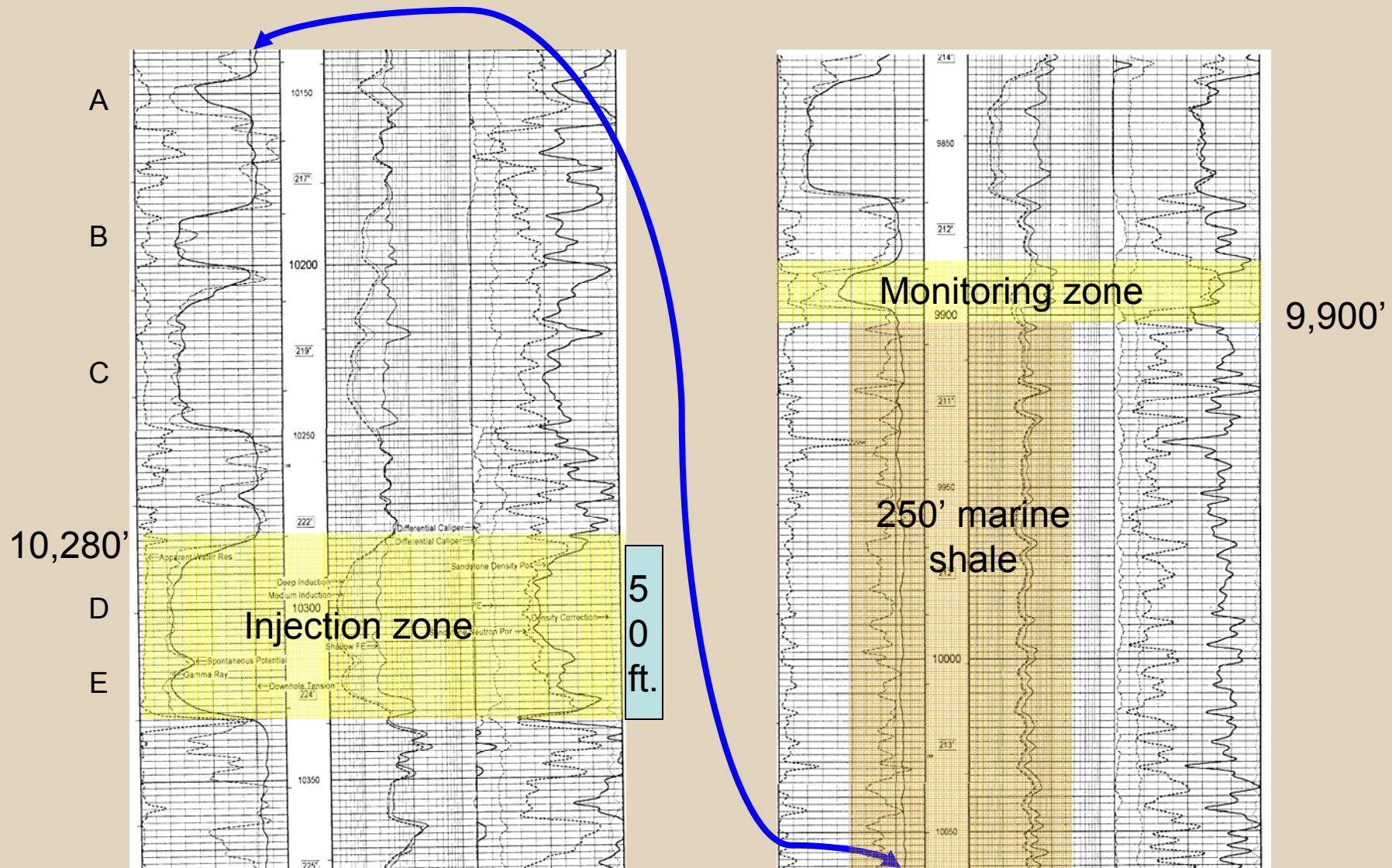
10,200'

BASAL SAND
Target EOR interval

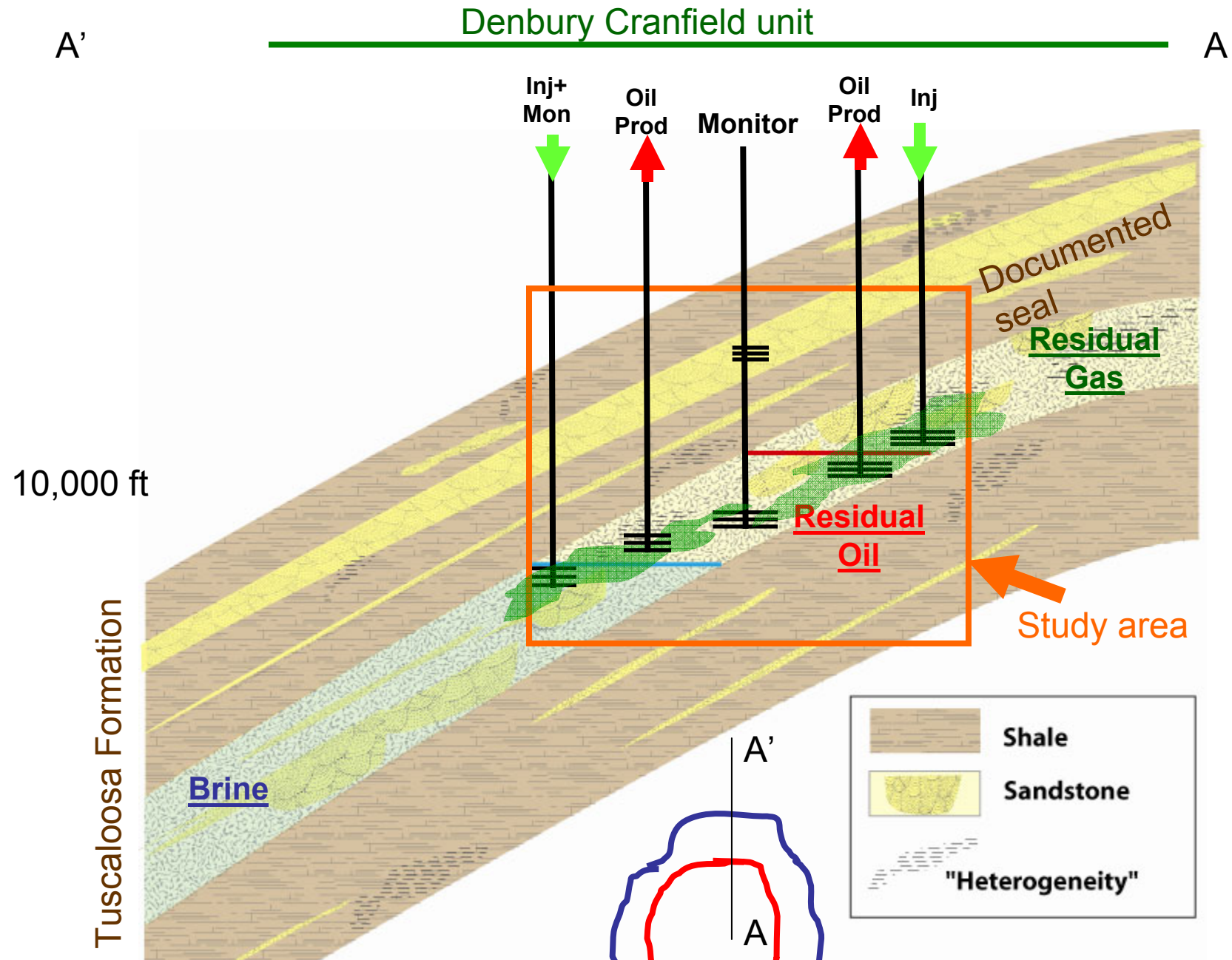
Existing PERF

Initial reservoir Temp: 125 C or 257 F gradient of 0.025 F/ft or 0.04 C/m; Original pressure: 4701 psia; 4391 psig July, 2005

Modern log from recently drilled injector well



Cranfield Schematic Overview

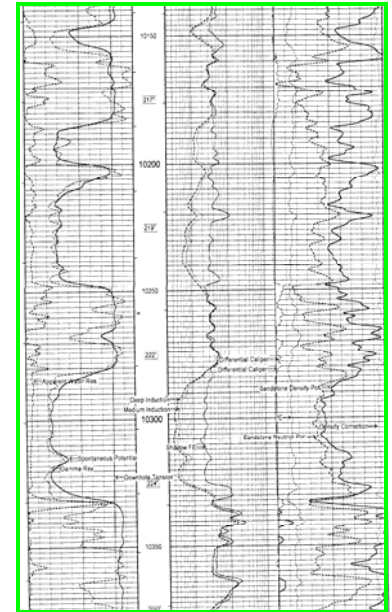
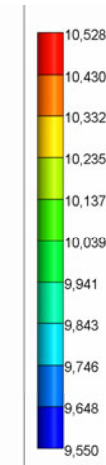
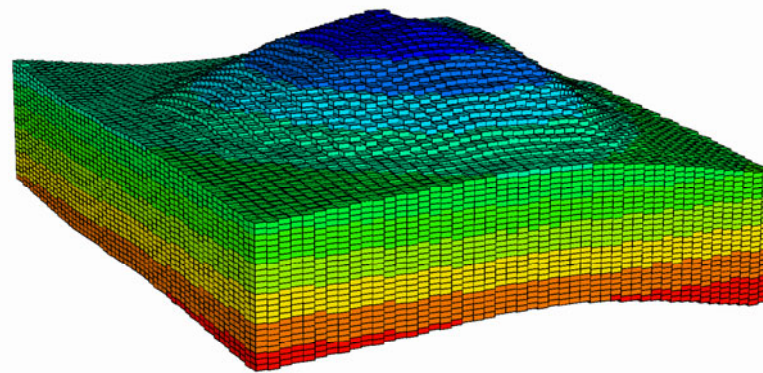


Monitoring Well Instrumentation

- Injection and monitoring zone press+temp
 - Fiber optic Distributed Temperature Sensing
 - Down-hole pasive microseismic
 - Geophones and/or fiber optic Bragg Grating Accelerometer
 - RST logging- model matching
-
- Extensive primary and repeat well logging campaign throughout field.
 - Well integrity logging: Caliper, cement bond, ultrasonic.

STATUS

- Environmental questionnaire submitted.
- Field visit for scoping.
- Denbury's first injector drilled, logged.
 - Core analysis underway.
- Model under construction.



Summer 2007 :

- Re-enter unused production well, instrument for continuous monitoring.
- 3-D Seismic

Thanks to all our collaborators and sponsoring organizations!



Denbury Resources, Inc.

